

CR 00-029
PATENT**Amendments to the Claims – Current Status of Claims**

1. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition comprising the steps of:

- providing a substrate;
- providing a solvent, having a solute comprised of dissolved metal ions disposed therein, the solvent and solute forming a binder solution;
- immersing the substrate into the binder solution;
- applying a voltage to the immersed substrate, the application of the voltage thereby providing for in situ formation of a binder material as a product of the reaction of the binder solution to the applied voltage and electrophoretic deposition of a the product formed in situ binder material to the immersed substrate, and thereby forming a layer of binder material on the immersed substrate;
- removing the substrate having the layer of binder material formed thereon from the binder solution;
- providing a suspension bath ~~characterized~~ consisting of as a colloidal solution of alcohol and a plurality of an emitting structure structures;
- immersing the substrate having the layer of binder material formed thereon, into the suspension bath;
- removing the substrate from the suspension bath; and
- thermal processing of the substrate to form adhesion properties.

2. (Previously Presented) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 1 wherein the step of providing a

CR 00-029
PATENT

substrate, includes providing a substrate having a plurality of patterned metal electrodes formed thereon a surface of the substrate.

3. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim [[4]] 1 wherein the providing a solvent, having a solute disposed therein, includes the step of providing at least one of an alcohol, a water, or a glycerin solvent, having a solute salt disposed therein.

4. (Previously Presented) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 3 wherein the binder material is magnesium hydroxide ($\text{Mg}(\text{OH})_2$).

5. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 3 wherein the step of providing a suspension bath characterized consisting of as a colloidal solution of an alcohol and a plurality of an emitting ~~structure~~ structures includes a colloidal solution of carbon nanotubes suspended in isopropyl alcohol (IPA) ~~a solvent~~.

6. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 5 wherein the step of providing a suspension bath characterized consisting of as a colloidal solution of an alcohol and a plurality of ~~an~~ emitting ~~structure~~ structures further includes the step of adding to the colloidal solution, a dispersion agent, to improve suspension properties.

CR 00-029
PATENT

7. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 5 wherein the step of immersing the substrate having the binder material formed thereon, into the colloidal solution of an alcohol and a plurality of an emitting structure structures further includes the step of applying a bias to the suspension bath, thereby providing for the migration and binding of the emitting structures to the layer of binder material.

8. (Previously Presented) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 1 wherein the step of thermal processing the substrate to form adhesion properties, further includes the formation of a plurality of micro-islands in the binder layer defined by a plurality of edges, the plurality of micro-islands having a plurality of emitting structures embedded in the micro-islands and protruding from the edges.

9. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition comprising the steps of:

providing a substrate having a plurality of metal electrodes formed thereon;

providing a binder solution including a solvent and a solute salt comprised of dissolved metal ions;

immersing the substrate into the binder solution;

applying a voltage to the immersed substrate thereby forming in situ a binder material as a product of the binder solution and the applied voltage;

CR 00-029
PATENT

electrophoretically depositing ~~a product~~ the binder material formed in situ on a surface of the immersed substrate, thereby forming a layer of binder material on the plurality of metal electrodes formed thereon the substrate;

providing a ~~carbon nanotube~~ suspension bath consisting of a colloidal solution of an alcohol and a plurality of carbon nanotubes;

immersing the substrate having the layer of binder material formed thereon, into the ~~carbon nanotube~~ suspension bath consisting of a colloidal solution of an alcohol and a plurality of carbon nanotubes;

removing the substrate from the ~~carbon nanotube~~ suspension bath; and

thermal processing of the substrate to form adhesion properties in the binder layer and form micro-islands defined by a plurality of edges, and having carbon nanotubes protruding from the edges of the micro-islands.

10. (Previously Presented) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 9 wherein the step of providing a solvent, having a solute disposed therein, includes the step of providing at least one of an alcohol, a water, or a glycerin solvent, having a solute salt disposed therein.

11. (Previously Presented) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 10 wherein the alcohol is one of methanol, ethanol, or isopropyl alcohol (IPA).

12. (Cancelled)

CR 00-029
PATENT

13. (Previously Presented) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 12 wherein the binder material is magnesium hydroxide ($Mg(OH)_2$).

14. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 12 wherein the step of providing a ~~carbon nanotube~~ suspension bath consisting of a colloidal solution of an alcohol and a plurality of carbon nanotubes includes the step of providing a colloidal solution of carbon nanotubes suspended in an alcohol solvent.

15. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 12 wherein the step of providing a ~~carbon nanotube~~ suspension bath ~~characterized as~~ consisting of a colloidal solution of an alcohol and a plurality of carbon nanotubes ~~of an emitting structure~~ further includes the step of adding to the colloidal solution, a dispersion agent, to improve suspension properties.

16. (Currently Amended) A method of fabricating a cathode using electrophoretic deposition as claimed in claim 12 wherein the step of immersing the substrate having the binder material formed thereon, into the ~~colloidal solution of carbon nanotubes~~ suspension bath further includes the step of applying a bias to the suspension bath, thereby providing for the migration and binding of the carbon nanotubes to the layer of binder material.

CR 00-029
PATENT

Claims 17-20 (cancelled)